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NWS Launches SKYWARN '76

The National Weather Service has launched SKYWARN '76—this year's campaign to strengthen public vigilance against tornadoes.

Each year, the NWS starts its safety campaign well in advance of the peak of the tornado season to give community leaders time to get ready for the deadly twisters.

Tornadoes are so small, short-lived and relatively rare that most people have never seen one. Yet they are incredibly violent. The funnel-shaped whirlwinds have leveled entire villages or several city blocks within a few moments. Tornadoes have propelled railroad cars through the air and impaled pieces of wood in metal fenceposts. Since 1916, when record-keeping began, they have killed more than 11,000 people in America.

Preliminary reports indicate that last year's death toll from tornadoes in America was 59. According to Allen Pearson, Director of the NWS National Severe Storms Forecast Center in Kansas City, Mo., the states with

Sea Grant Given To University Of Washington

The University of Washington has been awarded a Sea Grant of \$1,460,000 to pursue a broad range of marine topics including seafood waste utilization, coastal zone studies, and research in fisheries management. The Federal grant will be augmented by more than \$815,000 in matching funds from State and private industrial sources.

A unique industrial application of marine organisms found in the Northwest is being explored by the University's College of Forest Resources. Compounds called polymers, extracted from shellfish wastes and seaweeds, hold promise for use in non-woven textiles, as strengthening agents in paper products, and in the manufacture of plastics and pharmaceuticals.

Several paper companies in the Northwest are working closely with University scientists in developing a specific polymer

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the most tornadoes last year were Texas, with 118; Florida, 94; Nebraska, 78; Louisiana, 54; Illinois, 46; Alabama, 41; Iowa, 36; Mississippi, 35, and Oklahoma, 35.

Death tolls were similarly scattered, with the highest being in Texas, with 10; Mississippi, 9; Arkansas, 8; Missouri, 5; Georgia, 5; and Nebraska, 4.

The NWS is convinced preparedness programs do save lives.

Tornado highlights of 1975, according to Mr. Pearson, include:

--A "maxi" tornado that struck Neosho, Mo., at 8:04 p.m. April

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NOAA-43, 2nd New Flying Lab, Is Delivered

The second of two new WP-3D Orion aircraft purchased by NOAA was delivered last week to Eugene Bollay, Senior Scientist with the Environmental Research Laboratories' Weather Modification Program Office, at the Lockheed-California Company's Burbank plant. The \$7 million flying laboratory, designated N43RF, will be operated by ERL's Research Facilities Center in Miami, Fla.

When fully instrumented in 1977, "NOAA Forty-three" will

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Weather Effects of Giant Power Parks Calculated

Giant power plant installations planned for the future may generate weather as well as electricity, with thunderstorms, fog, increased rainfall, and whirlwinds among the possible meteorological "side effects," two Environmental Research Laboratories scientists believe.

Power parks, where plants generating as much as 50 billion watts would be concentrated in a single location, are contemplated by some as a means of satisfying the Nation's energy needs. Such energy centers would dissipate vast amounts of waste heat into the atmosphere, with a variety of effects on local weather possibly resulting, according to Drs. Steven R. Hanna and Franklin A. Gifford of ERL's Air Resources Laboratories.

Contract Let for "Weather Stations of the Future"

NOAA has signed a contract for 213 "weather stations of the future," Commerce Secretary Elliot L. Richardson announced this week.

An initial contract of \$4.3 million has been signed with Aeronutronic Ford of Palo Alto, Calif., to begin development and installation of the new NWS offices,

Satellite Helps Fishermen Find Salmon and Tuna

An environmental satellite operated by NOAA, able to measure the surface temperature of the ocean, is helping tuna and salmon fishermen along California's northern coast find productive fishing areas.

Early results of a pilot project using satellite infrared imagery to locate areas of "upwelling" off the coast—areas where colder, nutrient-rich bottom water rises to the surface—indicate that fishermen can save both time and fuel in finding these ever-shifting spots favored by salmon and tuna.

The technique being developed, it is believed, may have applications for fishermen in many parts of the world.

The research project is being conducted by the National Environmental Satellite Service and the Sea Grant program at Hum-

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tion of the new NWS offices, with the agreement that follow-on options to complete the work will bring the total contract to about \$37 million over a five-year period, the Secretary said.

Completion of the network is expected in 1981.

"These new weather stations are part of a program known as AFOS—an acronym for Automation of Field Operations and Services—which is expected to free forecasters of much of the drudgery they must perform now and enable them to provide a greatly expanded and accelerated weather service to the Nation at no increase in manpower. It will be especially helpful in speeding storm and flood warnings to people making critical, split-second decisions involving lives and property," Secretary Richardson said.

AFOS will provide NWS stations with high-speed data-handling and display capabilities by means of on-site minicomputers linked together in a nationwide network. Weather information from the minicomputers will be displayed on TV-like screens instead of on paper.

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The two researchers, who are with the ARL Atmospheric Turbulence and Diffusion Laboratory in Oak Ridge, Tenn., point out that power utility companies and government agencies are studying several sites as potential power parks that would generate 10 to 50 billion watts of usable energy.

In producing that energy, however, as much as 100 billion watts of waste energy would be dissipated, probably through some type of cooling tower. If towers for such a power center were spaced around an area of 100 square kilometers (about 40 square miles), the production of waste heat would amount to 1,000 watts per square meter (about 10.8 square feet)—three times greater than the average so-

lar energy reaching the outer edge of the earth's atmosphere, and nearly equal to the energy released in a thunderstorm.

Drs. Hanna and Gifford, whose research was supported jointly by NOAA and the Energy Research and Development Administration, believe a heat release of that magnitude could generate thunderstorms, or act as a triggering mechanism in areas where thunderstorms frequently occur naturally. The cooling towers would add moisture to the atmosphere, and their thermal plumes would act like a hill or mountain forming a barrier to air flow and causing abrupt lifting of air. The combined effects of moisture addition and buoyant lifting of air would increase pre-

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personnel perspective

Current Vacancies in NOAA

To insure that NOAA employees are aware of job possibilities throughout the agency, a list of current NOAA-wide vacancies is published below. Employees interested in any of the listed vacancies

should contact their servicing personnel office for information where to apply.

Announcement Number	Position Title	Grade	MLC	Location	Issue Date	Closing Date
383-76	Electronics Tech.	GS-10	NWS	Peoria, Ill.	1-21-76	2-4-76
384-76	Electronics Tech.	GS-11	NWS	Kansas City, Mo.	1-21-76	2-4-76
385-76	Electronics Tech.	GS-11	NWS	Kansas City, Mo.	1-21-76	2-4-76
389-76	Computer Specialist	GS-12	HDQS	Rockville, Md.	1-28-76	2-11-76
390-76	Marine Recreational Fisheries and Conservation Specialist	GS-14	NMFS	Washington, D.C.	1-28-76	2-11-76
392-76	Computer Specialist	GS-12	NWS	Silver Spring, Md.	1-28-76	2-11-76
393-76	Computer Systems Analyst	GS-11	NWS	Silver Spring, Md.	1-28-76	2-11-76
386-76	Staff Assistant for Marine Resources	GS-14	HDQS	Rockville, Md.	1-23-76	2-13-76
395-76	Flight Instructor	GS-13	ERL	Miami, Fla.	2-3-76	2-18-76
396-76	Biologist or Oceanographer	GS-12	ERL	Stony Brook, N.Y.	2-3-76	2-18-76
388-76	Mechanical Engineer	GS-11	NOS	Rockville, Md.	1-28-76	2-19-76
391-76	General Engineer	GS-13	NWS	Silver Spring, Md.	1-28-76	2-19-76
394-76	Production Control Manager	GS-14	NOS	Rockville, Md.	1-28-76	2-19-76
602-75	Supervisory General Engineer	GS-14	NOS	Miami, Fla.	1-28-76	2-19-76

Traumatic Injury Reporting And Compensation For Work Injuries

If you sustain an injury, which includes a possible occupational disease, damage to medical braces, artificial limbs, or other prosthetic devices, you may be entitled to benefits of the Federal Employees' Compensation Act (FECA). FECA is administered by the Office of Workers' Compensation Program (OWCP) within the U.S. Department of Labor.

Public Law 93-416 enacted September 1974, amended FECA to provide for a "Continuation of Pay" (COP), if an employee sustains a job-related disabling injury. These types of injuries have been termed "traumatic injuries" by the OWCP.

A traumatic injury is defined as a wound or other condition of the body caused by external force, including stress or strain. The injury must be identifiable by time and place of occurrence and by member of function of the body affected; and be caused by a specific event or incident or series of events or incidents within a single day or shift.

Traumatic injuries are distinguished from occupational diseases or illnesses in that the latter are produced by systemic infections; continued or repeated stress or strain; exposure to toxins, poisons, fumes, etc., or other continued and repeated exposure to conditions of the work environment over a longer period of time. Some examples of traumatic injuries are broken bones, back injuries, severe cases of poison ivy and severe bee stings.

Continuation of Pay (COP) begins the day after the injury is sustained and continues for 45 calendar days. No leave should be charged for the day of the accident. This is true in the case of any job-related injury.

An employee is required to report, within 48 hours, ALL injuries sustained while in the performance of official duties and ALL medical treatment for work-connected or suspected work-connected illness or disease. This requirement is mandatory even though there may be doubt that the injury was sustained in the performance of duty, or that the illness is actually work-connected.

A supervisor is responsible for reporting all accidents and injuries promptly, arranging for immediate medical attention, advising injured employees of the benefits available to them, assisting the injured employee completing the necessary forms to support claims for compensation, and submitting the employee's notice of injury if the employee is unable to do so. Again, the preceding is mandatory even though there may be doubt that the injury was sustained in the performance of duty, or that the illness is actually work-connected. In all cases, the OWCP, has the final responsibility for determining whether an injury or illness is work related. One further requirement for the reporting of a traumatic injury is that the injury report must be coordinated with your servicing personnel office.

Forms for Reporting a Traumatic Injury

CA-1, "Federal Employees' Notice of Traumatic Injury and Claim for continuation of Pay/Compensation," must be filed by the injured employee or someone acting in his or her behalf within 48 hours after the injury.

CA-17, "Duty Status Report," should be used to obtain interim medical reports concerning the employee's ability to return to duty status.

CA-7, "Claim for Compensation on Account of Traumatic Injury," is to be filed when medical evidence shows that the disability is expected to continue beyond the 45 days of COP and compensation is desired after the expiration of this period. CA-7 must be filed with OWCP within five days after the end of the 45 days.

In some cases, other claim forms may be necessary and guidance for their filing can be obtained from your servicing personnel office.

Attention Prospective Retirees

Federal Employees Health Benefits and FEGLI Life Insurance may be continued into retirement provided the retiree meets the qualifications which are explained in the following paragraphs. The U.S. Civil Service Commission receives a steady flow of complaints from employees and new retirees who claim to have been unaware of the requirements to be eligible to continue health benefits upon retirement, as well as, employees and retirees who lose FEGLI insurance because they do not meet the qualifications.

The Federal Employees Health Benefits law permits a retiree to continue health benefits into retirement if his or her retirement is:

1. on an immediate annuity;
2. after 12 or more years of creditable service or under the disability provisions of the retirement law and;
3. after enrollment (or coverage as a family member) in a plan (not necessarily the same plan) under the program during:
 - the 5 years of service immediately preceding retirement, or
 - all service since his first opportunity to enroll.
4. the annuity must be sufficient to cover the cost of the Health Benefits Enrollment. The full employee cost of the Health Benefits plan in which the employee is enrolled will be withheld from the annuity monthly.

An employee who retires retains his or her regular life insurance (not accidental death and dismemberment) without further cost if he or she meets the following requirements:

- a. retirement from a position in which the employee was insured;
- b. nonconversion to an individual policy when his or her regular insurance as an employee would otherwise cease;
- c. retirement on an immediate annuity;
- d. retirement for a disability or after at least 12 years creditable service.

An employee who retires retains his or her optional life insurance (not accidental death and dismemberment) if he or she is eligible to continue regular insurance and if, in addition, he or she has had optional insurance in force for no less than:

- a. The full period or periods of service during which it was available to him or her (for this purpose, April 14, 1968, is the earliest date on which optional insurance was available); or
- b. The 12 years of service immediately preceding his or her retirement.

The full cost of the optional will be withheld from the annuity for the period before the first of the month following the employee's sixth-fifth birthday during which an insured retired employee receives an annuity. Thereafter (or if the employee retires after age 65), there is no cost for the optional.



PARTICIPANTS IN THE RECENT ANNUAL SEMINAR ON NOAA CORPS PERSONNEL ACTIVITIES held at NOAA's Rockville, Md., headquarters included (seated, from left) Capt. Philip J. Taetz, Lt. William L Adams, NOAA Corps Director R. Adm. Harley D. Nygren, Cdr. Kenneth F. Burke, Lt. (jg) Karen L. Pasciuti, (standing, from left) Lt. Edward E. Seymour, Lt. Michael C. Meyer, Cdr. Karl W. Kieninger, Lt. Wayne F. Turnacliff, Capt. Miller J. Tonkel, and Cdr. Ralph J. Land.

NOAA-43 Is Delivered (Continued from page 1)

Join an historic squadron of research aircraft in a broad range of environmental missions, including studies of severe storms, cumulus cloud and hurricane modification, air-sea interactions, air quality, and weather and climate.

NOAA project scientists view the arrival of the two Orions as a major milestone for research meteorology.

The new aircraft has flown to Ontario, Calif., for further outfitting by Lockheed Air Service Company, and in April, it will move to the RFF at Miami International Airport, where the rest of its instrumentation will be installed.

Superficially, the WP-3D resembles the turboprop transport Electra, the tougher, more powerful Orion series developed to carry out the U.S. Navy's anti-submarine warfare and weather reconnaissance missions, except it has additional bubble

Massachusetts Tax Increases

Employees who are subject to state tax withholdings for the State of Massachusetts may notice a minor change in their state tax for salary checks dated on or after February 25, 1976.

noaa week

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Catherine S. Cawley, Editor
Warren W. Buck, Jr., Art Director

and passenger windows in the fuselage, and belly and tail radomes.

Powered by four Allison turboprop T-56-A-14 engines, each rated at 4,910 equivalent shaft horsepower, it can operate effectively from sea level to 30,000 feet (9,100 meters), and loiter at speeds between 180 and 225 knots (355 and 415 kilometers per hour).

In addition to the pilot, copilot, flight engineer, and navigation-communication operator, it can carry a mission crew of twelve scientists, technicians, and observers and five passengers.

"Weather Stations of the Future" (Continued from page 1)

This all-electronic system will eliminate the tedious process of tearing off and filing the huge volume of messages and maps now being received on teletypewriters and facsimile machines.

A weather map will arrive on the TV-type displays in about 1/40th the time it takes on paper—15 seconds instead of 10 minutes. Messages will arrive 30 times as fast—3,000 words per minute instead of 100. Nationwide, the new system will carry in less than three hours the same amount of information now carried in 24. A message will go from an originating station to the station most remote from it on the main circuit in about 25 seconds.

AFOS will be instituted at two levels. The first level will be automation of 52 Weather Service Forecast Offices; three NWS National Centers (the National Meteorological Center in Suitland, Md., the National Hurricane Center in Miami, Fla., and the National Severe Storms Forecast Center in Kansas City, Mo.) and the Environmental Data Service's National Climatic Center in Asheville, N.C.; and 14 River forecast Centers. These will be linked by an 11,620-mile full-duplex communications line of telephone quality called the National Distribution Circuit.

ENDEX Lists Ocean Bottom Photos

The Environmental Data Service's National Oceanographic Data Center (NODC) has now entered information on over 250,000 ocean bottom photographs into its Environmental Data Index (ENDEX) computer referral system. The information in this bottom photo file is available to all requesters. The photos were taken worldwide during 7,437 camera lowerings from oceanographic vessels.

For each lowering the system can tell an inquirer the address of the holder of the negatives, type of camera and film, number of photos, location of lowering, date, ship name, and cruise and station number. Also available

for many lowerings is the percent of sea floor covered by manganese nodules, water depth, and whether core, grab, dredge, or current measurements were taken concurrently with the photographs. The file may be searched on any of the above mentioned terms.

NOCD does not have any of the 250,000 photos in its possession, but can tell a requester from where they may be obtained.

Further information on the bottom photographs can be obtained from the Data Index Branch, NODC, NOAA, Washington, D.C. 20235. Tel.: 202-634-7298. Access to ENDEX is free to NOAA employees.

Weather Effects of Power Parks (Continued from page 1)

No existing power facility releases anywhere near 100 billion watts of heat, but there are comparable stationary heat sources that the NOAA scientists believe can provide clues to the meteorological effects of giant power parks. Examples are: the Surtsey volcano, which emerged from the sea south of Iceland in 1963, released an estimated 100 billion watts of heat from an area less than a square kilometer (about .39 square miles); large bush fires in Australia; under favorable conditions, the static firing of a Saturn V booster rocket; and the well known "heat island" effect of urban areas.

Intense heat sources may also generate vortices (whirlwinds) in the atmosphere.

"Wet" cooling towers—those that eject moisture as well as heat—would also produce ground fog downwind. Drs. Hanna and Gifford estimate that fog would occur about 66 percent of the time 20 kilometers (about 12 miles) downwind of the cooling towers and 21 percent of the time 100 kilometers (about 62 miles) from the site. If winds are equally probable from all directions, this means that a given spot 20 kilometers (about 12 miles) away would have ground fog four percent of the time.

"Meteorological Effects of Energy Dissipation at Large Power Parks," a paper by Drs. Hanna and Gifford, appeared in the Bulletin of the American Meteorological Society.

The second level will be extension of AFOS into each Forecast Office's area of responsibility (generally a state) by some degree of automation of the Weather Service's smaller field units—the Weather Service Offices and Meteorological Observatories. Messages between Forecast Offices and these satellite offices also will be relayed by high-speed communications. About 153 smaller field units will be automated, under this contract.

Each Forecast Office will act as the collection point for all weather data acquired within its area. It will store the data locally and pass it on to other weather offices as needed. Thus the AFOS program contrasts sharply with previous trends in computerized data handling in that it decentralizes the process rather than centralizing it. Minicomputers have made this possible.

Each automated station will have at least one minicomputer. Some larger stations will have as many as four. Each minicomputer will have a built-in memory of about 64,000 characters (letters or numbers), plus at least nine million characters in storage on disks. Data inside a minicomputer will be available instantaneously; from disks in less than a tenth of a second.

Forecasters will have available

a tremendous variety of weather maps and messages they can call up within seconds, to prepare forecasts and warnings. To keep the data manageable, the minicomputers will be programmed to pull off the National Distribution Circuit only that data a Forecast Office wants. Information that has outlived its operational usefulness will be automatically purged.

The AFOS system will be enhanced by other automated devices and systems in existence or being developed—such as automatic weather-observing stations, digitized radar, and computer-assisted measurements of the upper air. These linkages will allow fast and frequent observations of changes taking place in the weather.

AFOS minicomputers will be capable of driving existing teletypewriter and facsimile equipment, as well as calling up images on TV screens, so that Weather Service customers such as private meteorologists and airlines can continue to receive data as they do now. Later on, such subscribers will be able to rent or buy TV-type terminal equipment if they choose.

Through more efficient operations, Weather Service officials expect the AFOS network to pay for itself in eight years.

Annual Campaign for Vigilance Against Tornadoes Launched (Continued from page 1)

24, causing \$17 million in damage to homes and other property but killing no one within the city because of a tornado watch about 90 minutes ahead of the tornado and a warning an hour in advance. The *Neosho Daily News* said tens of hundreds of persons surely would have been killed or maimed had it not been for "quick and efficient action" of public safety officials "who set emergency procedures in motion, giving citizens the very few minutes they needed to take cover."

--One of the most destructive single tornadoes of all time which hit Omaha, Neb., on May 6, causing three deaths, about

200 injuries, and damage to more than 2,000 homes and other structures. Property damage was estimated in the hundreds of millions of dollars. Headlined the Omaha *World-Herald*: "It Could Have Been Worse; But Tornado Alert Worked."

--The second tornado to strike Tulsa, Okla., in 19 months, this one occurring on Dec. 5, 1975, causing no deaths, 34 injuries and property damage estimated at \$10 million. Tulsa's traditionally excellent response to storm alerts was responsible for the absence of deaths, according to investigators.

In addition to the tornado watches and warnings, and to swift community response, Mr. Pearson said another reason for the relatively low death toll during 1975 was that there were few "maxi" tornadoes during the year—the kind with winds ranging up to 200 miles an hour or more, path lengths extending beyond 30 miles, and path widths of a half mile or more.

"Paradoxically," he said, "it is with these kinds of storms that the warning-and-preparedness programs pay off most, because these tornadoes stay on the ground longer, giving warnings a chance to work. Our statistics indicate that two percent of all tornadoes cause about 95 percent of the fatalities, and that most of that two percent, by far, are maxi-tornadoes."

In its community-preparedness program, the NWS points out that tornadoes are so erratic that generalizations about them are difficult.

While most tornadoes occur in the Deep South and in the rela-

tively flat land between the Rockies and the Appalachians, while peak months are April, May and June, and while a typical time of occurrence is an unseasonably warm, sultry afternoon between 4 and 6 p.m., it is important to remember this: tornadoes have occurred in every state of the union, they have occurred in every month of the year (southern states are usually hit hardest in winter and early spring, northern in spring and summer), and they have occurred at every hour of the day and night.

Most tornadoes travel from southwest to northeast, average about five to 10 minutes on the ground in a path no more than an eighth of a mile wide by two to five miles long. Forward speed averages about 30 miles an hour, but may reach as much as 70.

Recent studies indicate it is the savage wind blast that does most of the damage, rather than explosive decompression, and recommend that designated shelter areas be small, interior rooms and interior corridors well away from doorways.

NWS officials point out that the human eye is still the only reliable means of detecting tornadoes, and that—despite radio satellites, and other sophisticated instruments—they must depend on a vast number of volunteer observers to make the SKYWARN alerting system work.

The alerting system has two phases: a tornado watch, issued when atmospheric conditions are ripe for tornadoes to form, and a tornado warning, issued when a tornado actually has been spotted or indicated by radar.

Most sightings of the ominous funnel-shaped clouds are made by volunteer spotters, who pass the word to official warning points.

This vital work is performed by thousands of public-spirited citizens organized into spotter networks. One aspect of SKYWARN is to recruit and train more spotters where needed.

An especially important part of SKYWARN is its attempt to explain what each individual can do to protect himself and his family, since no one is entirely safe from these deadly storms.



A SPECIAL ACHIEVEMENT AWARD was presented recently to Joe Miller, First Mate of the NOAA Ship Albatross (left), for technical support he provided to the NOAA Ship Miller Freeman on deep, heavy-gear trawling operations.

The Award was presented by R. Adm. Alfred C. Holmes, Director of the National Ocean Survey's Atlantic Marine Center, in Norfolk, Va.

Satellite Helps Fishermen

Humboldt State University in Arcata, Calif.

Fishermen and oceanographers have known for years that as strong winds from the north and northwest blow along California's coast, coastal surface water is moved offshore and is replaced through upwelling.

Bottom water, according to Fred Jurick, a Sea Grant marine advisory agent at Humboldt State, is rich in nutrients which, when they come to the surface, cause huge blooms of plankton, the primary food source for marine life. This attracts bait fish, which in turn attract tuna and salmon.

In recent years, efforts to plot the location of upwelling have included taking infrared temperature readings from aircraft—attempts often successful, but with drawbacks such as weather restrictions on operations, limited aircraft range, and high cost.

NOAA's polar-orbiting satellite, equipped with both visual and infrared sensors, passes over the coastal area twice daily, relaying environmental data, in-

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cluding sea surface temperatures, back to earth.

This information, according to NESS Oceanographer Larry Breaker, is converted into images displaying a number of gray shades, each representing a particular interval of temperature. As a result, thermal fronts where cold, upwelled water meets the warmer offshore surface water show up clearly as gray-shade boundaries.

The locations of thermal fronts are transferred to navigation charts, copies of which are then furnished to fishermen at various northern California ports.

The NESS-Sea Grant program is only one of several projects utilizing NOAA satellites and aimed at assisting fishermen. A second effort shows promise of pinpointing concentrations of algae in water by satellite infrared identification of the chlorophyll in the marine plants. Many kinds of fish tend to congregate in algae-rich waters.

The chlorophyll project uses infrared sensors aboard NOAA satellites which are in geostationary orbit above the equator.

U. of Washington Sea Grant (Continued from page 1)

called chitosan, derived from shellfish wastes. Laboratory tests have shown that chitosan increases both the wet strength and opacity of paper.

The Coastal Resources Program, now in its second year, is expanding its operations to develop and test new methods for dealing with problems in the coastal zone.

Under this year's grant, a team of scientists will conduct research into both the commercial and recreational fisheries of the Northwest Pacific including the clam resource in Garrison Bay and the recreational fishery (exclusive of salmon) in northern Puget Sound.

Aquaculture researchers will continue studies of several commercially important varieties of finfish, shellfish, and seaweed.

Over the past several years, with Sea Grant support, the Uni-

versity's Institute for Marine Studies has developed a number of programs at the Master's and Ph.D. level to help prepare graduate students for professional careers in marine policy making and for teaching research. This year, more than a dozen courses will be offered, encompassing coastal zone planning and administration, marine resources development, offshore technology, international law of the sea, and marine transportation and commerce.

In addition, a special technician training program will continue. Five Washington community colleges—Grays Harbor College, Clover Park Educational Center, and Seattle, Shoreline, and Highline Community Colleges—will offer courses in marine mechanics, petroleum handling and transportation, and commercial diving.

obituaries

Hubert E. Boyd, Sr.

Hubert E. Boyd, Sr., former Meteorologist in Charge at the National Weather Service Office on Kwajalein Island, died on January 24. He had retired in 1970, after serving the NWS since 1941. His assignments included Corpus Christi, Brownsville, San Antonio, and Fort Worth, Tex.; Little Rock, Ark.; Wake Island; Honolulu, Hawaii; and the Pacific Missile Testing Range.

He is survived by his wife, Betty, a daughter, and five sons. The family may be contacted at P.O. Box 811, Cuero Tex. 77954.

Hugh L. Proffitt

Hugh L. Proffitt, former Chief of the Verification Branch at the National Ocean Survey's Atlantic Marine Center in Norfolk, Va., died in Morehead City, N.C., on January 20. He had retired in 1974 after 38 years' service at AMC.

He is survived by his wife, Mrs. Louise Jordan Proffitt, of Morehead City; a son, Douglas, of Tampa, Fla.; his mother, Mrs. Essie Proffitt, of Spartanburg, S.C.; five sisters; a brother; and two grandchildren.



National Oceanic and Atmospheric Administration

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